



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/692,139

10/22/2003

Yoshikazu Takahashi

501558.20005

9158

26418

7590

02/02/2007

REED SMITH, LLP

ATTN: PATENT RECORDS DEPARTMENT

599 LEXINGTON AVENUE, 29TH FLOOR

NEW YORK, NY 10022-7650

EXAMINER

MRUK, GEOFFREY S

ART UNIT

PAPER NUMBER

2853

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
--	-----------	---------------

3 MONTHS

02/02/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/692,139

Applicant(s)

TAKAHASHI, YOSHIKAZU

Examiner

Geoffrey Mruk

Art Unit

2853

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-19 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 13 and 19 is/are allowed.
- 6) ☒ Claim(s) 1-3, 5, 8, 12, 14 and 15 is/are rejected.
- 7) ☒ Claim(s) 4, 6, 7, 9, 10 and 16-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/13/06</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 8, 12, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Ikeda (JP 64-18460).

With respect to claim 1, Ikeda discloses a droplet ejecting apparatus (page 2), comprising:

- a channel unit (Fig. 1, element 11) having a plurality of pressure chambers which communicates, at a respective first end thereof, with a liquid supply manifold (Fig. 1, element 17) so as to be supplied with a liquid by the liquid supply manifold and, at a respective second end thereof, with respective nozzles (Fig. 1, element 16) so as to eject respective droplets of the liquid through the respective nozzles (page 3); and
- an actuator unit (bimorph type) fixed to the channel unit,
- wherein the actuator unit has a plurality of groups of active portions each group of which includes at least two active portions (Fig. 1, elements 13 and 14) which are opposed in a first direction to a corresponding one of the plurality of pressure chambers (Fig. 1, element 11), at respective different positions in a second direction perpendicular to the first direction, and

- wherein each of said at least two active portions of said each group includes a piezoelectric sheet (Fig. 2), and a first electrode (Fig. 2, element 23) and a second electrode (Fig. 2, element 25) which are opposed to each other in a direction of thickness of the piezoelectric sheet that is parallel to the first direction, such that the first and second electrode cooperate with each other to sandwich the piezoelectric sheet (page 4), and
- wherein when an electric voltage is applied across the first and second electrodes of said each of the at least two active portions of said each group, the at least two active portions are deformed to change a volume of said corresponding pressure chamber (Fig. 5; page 6).

With respect to claim 5, Ikeda discloses an outer end portion of at least one of the at least two active portions (Fig. 1, elements 13 and 14) of said each group that are opposed to the corresponding pressure chamber (Fig. 1, element 11) is located at a position corresponding to a vicinity of an end portion of the corresponding pressure chamber (page 6).

With respect to claim 8, Ikeda discloses the corresponding pressure chamber (Fig. 1, element 11) comprises an elongate pressure chamber (Fig. 2); and the at least two active portions (Fig. 1, elements 13 and 14) of said each group comprise two elongate active portions which are distant from each other in a lengthwise direction of the elongate pressure chamber and each of which extends parallel to the elongate pressure chamber (page 4), and wherein the elongate pressure chamber has a first width, and

Art Unit: 2853

each of the elongate active portions has a second width smaller than the first width (Fig. 2, element 28).

With respect to claim 12, Ikeda discloses the liquid supply manifold (Fig. 1, element 17) comprises an ink supply manifold (Fig. 1, element 15) which supplies an ink as the liquid, and wherein the actuator unit changes a volume of each of the pressure chambers (Fig. 1, element 11) of the channel unit, so as to eject, from a corresponding one of the nozzles (Fig. 1, element 16), a droplet of the ink as the droplet of the liquid and thereby form an image on a recording medium (page 2, inkjet printer; page 6, operation).

With respect to claim 14, Ikeda discloses a driver circuit (Fig. 4) which drives the actuator unit in a single driving mode in which the driver circuit simultaneously applies respective equal electric voltages to said at least two active portions (Fig. 5, c) of an arbitrary one of the plurality of groups so as to deform said at least two active portions and thereby change the volume of said corresponding pressure chamber, and which does not drive the actuator unit in any modes different from said single driving mode (page 6).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ikeda (JP 64-18460) in view of Kubota (US 5,144,342).

With respect to claim 2, Ikeda discloses the respective piezoelectric sheets of the at least two active portions (Fig. 1, elements 13, 14) of said each group comprise respective portions of a common piezoelectric sheet (Fig. 2, elements a-j) which additionally includes at least one intermediate portion (Fig. 1, Area between elements 13 and 14) continuous with said respective portions in a direction in which said at least two active portions are distant from each other (page 4).

With respect to claim 3, Ikeda discloses each group comprises two active portions (Fig. 1, elements 13 and 14), and wherein a distance between the two active portions of said each group is selected at a value (Fig. 1, Area between elements 13 and 14) which assures that, when the two active portions are elongated in the direction of thickness of the common piezoelectric sheet, a an intermediate portion of the common piezoelectric sheet that is located between the two active portions is elongated (Fig. 5, steps b-d) in a same direction as the direction of elongation of the two active portions (page 6).

With respect to claim 15, Ikeda discloses the common piezoelectric sheet (Fig. 1, elements 13 and 14) is commonly opposed in the first direction to respective entire areas of the plurality of pressure chambers (Fig. 1, element 11).

However, Ikeda fails to disclose the respective portions of the common piezoelectric sheet are polarized in a direction of thickness of the common piezoelectric sheet, and wherein when an electric field is applied to the respective portions of the common piezoelectric sheet, in a same direction as the direction of polarization thereof, said at least two active portions are elongated in the direction of thickness of the common piezoelectric sheet.

Kubota discloses an ink-jet printer where "Ink-jet printers are known as one kind of terminal equipment for computers. Heads for on-demand type ink-jet printers which utilize piezoelectric elements as actuators are classified into two major types, namely into bimorph-type heads and piston-type heads" (Column 1, lines 11-15) and "Each of the piezoelectric elements 33a and 33b serves a piezoelectric vertical effect; that is to say, depending on a voltage applied to the electrode 35a, the piezoelectric element 33a selectively expands and contracts in the direction indicated by an arrow C which is parallel to the electric field impressed by the electrode 35a and 34a" (Column 4, lines 51-57).

At the time of the invention, it would have been obvious to use the piezoelectric elements as actuators disclosed by Kubota in the piezoelectric type fluid ejection nozzle of Ikeda. The motivation for doing so would have been "to provide a head for an ink-jet printer which can enhance the mounting density of nozzles" (Column 2, lines 34-36).

Allowable Subject Matter

1. Claims 13 and 19 are allowed.
2. Claims 4, 6, 7, 9, 10, 16, 17, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

Applicant's arguments with respect to claim 1 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

Art Unit: 2853


the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Geoffrey Mruk whose telephone number is 571 272-2810. The examiner can normally be reached on 7am - 330pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Meier can be reached on 571 272-2149. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GSM
1/27/2007



STEPHEN MEIER
SUPERVISORY PATENT EXAMINER